

furnaces which operate satisfactorily should conform to it. This may be determined as follows:

The air enters the heating chamber of the open-hearth furnace

!; preheated to a temperature of 1000° to 1100° , as does the producer

gas. Their combination forms a *flaming jet* which, according to

the Wanner pyrometer, has a temperature of from 1800° to 1850°

! instead of the theoretical temperature or *calorific intensity* of a

flame in an athermal chamber of 2100° or more.[^]

Knowing the quantity of fuel which is transformed into gas in the producer per second and its composition, it is not difficult to compute the volume per second of the producer gas and the air required for its combustion. Consequently it is not difficult to compute the velocity with which the preheated gas and air enter the heating chamber.

I For example, a furnace which has a nominal capacity of 30

tonnes, and is operated to make four melts per day, consumes 0 kg 347 of coal per second, and this at 0° corresponds to 1 m³ 81 of

gas and 2 m³ 52 of air per second. & Assuming 1000° as the temperature of the gas and the air, the volumes entering the heating chamber each second will be 8 m³ 44 of gas and 11 m³ 77 of air. The gas and the air combine in the heating chamber of the furnace

! and give a current of flaming gases at a temperature of 1850° .

! To what depth will this jet of flame drop within the heating

chamber, if the gas and the air are flowing into the chamber with

; velocities equal to V_{air} and V_{gas} , making angles of α and β with

the horizontal?

The operation of an open-hearth furnace is impossible unless the bottom is well sintered in place. If the bottom is not well made, it will be dug up or float up on the molten metal, and in a furnace in which the bottom cannot be thoroughly sintered the metal will not be sufficiently heated.

i ! The depth H of the gaseous jet must absolutely be greater than the distance from the sill of the gas port to the tapping hole.

(1) The method of computing the *Calorific Intensity Curves* of various combustibles, as developed by the translator from the methods of Mallard and Le Chatelier, and as used by Damour, are given in an appendix to this volume.

^{C2)} One kilogram of coal gives approximately 5 m³ **22** of producer gas; this requires about 6 m³ 54 of secondary air, this being 1.25 times the theoretical air supply, plus 0 m³125 of air for the oxidization of certain elements of the metallic bath.